REMARKS

Claims 1-4, 6, 8, 9, 11, 12, and 14-20 were rejected as being unpatentable over Jordan in view of Garcia. Claims 7, 10, and 13 were rejected as being unpatentable over Jordan in view of Garcia in view of Bertis. Applicant requests reconsideration.

Independent claims 1, 8, and 12 were amended to include the purpose of generating forwarding and routing tables in a cache, and to change "routing" to "forwarding and routing", being more particular. New Claim 21 claims the specific association as transmitted and the relative unilateral communication so that random citations to prior art elements without such association and communication would be largely irrelevant.

Claim 19 was amended to depend on new dependent claim 21, so that, claim 1 claims the specific association and relative communication, with claim 21 claiming that this specific association of information is unilaterally communicated when transmitted, with claim 19 depending on claim 21, and with claim 19 claiming the distal table building application of such specific association of routing information that is unilaterally communicated, relative to those associations and respective caches, for the purpose of building distal forwarding and routing tables. Applicant now responds by first repeating the prior response, and then addresses the examiner's rebuttals at the end of these remarks.

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From the previous Amendment:

"a) The examiner states that claim 1 does not reference the tri-reference association. Anyone skilled in the art must realize that in order to send a message to a destination through the web, the destination IPA must be included. The tri-referenced information includes the originating URL, the source IPA, and the destination IPA. That is, the routing information sent must necessarily include the originating URL, the source IPA, and the destination IPA.

b) The examiner states that Jordan transmits routing information (such as source address, destination address, forwarding address, next hop address as disclosed upon request). What is strikingly missing from this list is the necessary originating URL.

c) The examiner states that transmitting to one destination is not broadcasting and that claim preambles do not limit the claims. If the preamble is not a limitation, then the reference to broadcasting in the preamble, respecting claim 1, seems misplaced. Surely the communication to one destination cache is a minimal, point-to-point broadcast, but a broadcast nonetheless. Claims 11 and 14 particularly claim repeating the communication, which perfects a wide-area broadcast. Also, the destination can build a forwarding and routing table from the receipt of a plurality of routing information. Broadcasting and table maintenance are the uses of the claimed tri-reference communication. Applications and uses are spelled out in the preamble, not as limitations, but as uses and applications. While uses and applications are not recited

element limitations, they nonetheless go to obviousness, in that, the problem solved is relevant, to wit, building a URL-to-distal cache routing table through broadcasting. Hence, applicant's discussion as to obviousness and the problem solved brings in discussion of broadcasting for forming the distal routing table.

Applicant devised tri-reference routing information to solve the prior art problem. The tri-reference routing information communication is the solution, to solve the problem of distal table maintenance. It this regard, Jordan and Garcia have no commonality with which to arrive at the present invention. Communication of routing information by Jordan and the maintenance of table in Garcia are not related in any regard, and the combination of them does not suggest the invention in any regard. The examiner has simply taken isolated features and combined them based upon forbidden hindsight reconstruction. Jordan does not communicate the tri-reference information. And Garcia does not receive the tri-reference information nor use tri-referenced communicated routing information to maintain tables.

d) The examiner first indicated that the claims do not recite a table. Hence, claims 19 and 20 were added. Applicant is claiming a method of communicating tri-referenced routing information that can be broadcast and that can be used to build routing tables in receiving distal caches. The examiner states that Garcia discloses broadcasting the routing update messages comprising routing information. Yet the examiner did not recite what exactly is that information, which particularly relates to Internet Protocol packet routing in the case of Garcia. Furthermore, Garcia does not

communicate tri-referenced routing information that includes an originating URL. Both Jordan and Garcia do not communicate tri-referenced routing information and both particularly do not communicate the originating URL. Without source IPA, originating URL, and the destination IPA, combined as routing information, which may incidentally be wide-area broadcast and used to build routing tables, Jordan and Garcia cannot possibly suggest the claim inventions.

e) The examination's inability to recognize the invention, led the applicant to assist the examiner though the inclusion of claims 19 and 20 wherein the tri-referenced routing information is actually used to build routing tables. Prior to adding new claims 19 and 20, routing tables were not claimed. Applicant will assist the examiner as necessary to fully gain understanding of the inventions and the prior art.

f) The terms hop, path, link, are well understood by those skilled in the art. There is no ambiguity.

The claims were rejected in part because the claims do not recite intended applications of the method steps for broadcasting associated routing information or recite arguments used in support of non-obviousness. These rejections are misplaced. The examiner states, on page 4, "In other words, the features upon which applicant relies, (as in applicant's arguments), are NOT recited in the rejected claims". This is a common perfunctory rejection often

correctly used by examiners in anticipation rejections, but so often misplaced in the context of obviousness rejections.

In claim 1, applicant claims a method of broadcasting, which method is executed solely at the proximal cache, AND NO MORE. This claim clearly sets the reference perspective as being the proximal cache at the proximal IPA. As such, a potential infringer has to notice that a proximal cache, so broadcasting, that is merely broadcasting without regard to creating a forwarding and routing table at a destination, perfects the method and is covered by the claim. With this broadcasting method, a routing and forwarding table at the destination can then be maintained at a distal cache. As such, applicant claims the method of broadcasting only in so far as the execution is exclusively performed at the proximal cache.

There is no requirement that claim 1 also includes language as to the intended uses or applications of this broadcasting method or requirement that this claim claims the benefits of this broadcasting method, as the examiner incorrectly suggests. An obviousness determination is focused upon whether or not the claimed combination is obvious. The determination of obviousness goes to both the solution as in part claimed in claim 1 and the problem solved as stated in the argument. As to the solution in part, the combination of claim 1 has not been rejected as anticipated, but rejected for obviousness. Anticipation can be determined by an element-by-element comparison. Applicant did not address an anticipation rejection, where elements must be recited in the claims and not found in a single prior art reference. If

applicant had argued that claim 1 was not anticipated because the prior art does not teach a destination routing table in combination, then the examiner's assertion would have been correct, and the routing table should be recited in the claims. However, the rejection is one of obviousness that brings into consideration a whole variety of related issues, such as, a long felt need without solution, and of course, the prior art problems solved. Surely, the examiner would not suggest that the claims must specifically recite the number of years that the prior art had such a long felt need, or necessarily recite the prior art problems solved, yet these two things do support a non-obviousness determination. Arguments that a claimed invention is not obvious need not be recited in the claims. It is simply enough that the combination not be anticipated, as indicated in the present record, and that the combination of claim 1, not be obvious. It is simply enough that the claimed broadcasting method steps in combination not be suggested, yet be useful. The reasons why a claim combination would not be obvious need not be recited in the claims. The examiner's basis for rejection because applicant's arguments are not found in the claims is without merit in the present obviousness determination context.

The claims are patentably distinct as written. New claims 19 and 20 add another step to claims 1 and 8 respectively of storing the association in the destination cache at the destination IPA, whereat a forwarding and routing table can be maintained. Hence, the use of the claimed combination of the broadcasting method of claim 1 then enables the creation of forwarding and routing tables at the destination IPA, and hence, enables the migration of routing

information containing associations between URLs and source web cache IPAs subsequently stored as routing items in forwarding and routing tables at destination IPAs. Significantly, the claim 1 steps provide a method of broadcasting routing information that can then be used by other distal caches for accomplishing the migration of forwarding and routing tables. Claim 1 claims a broadcasting method and not the creation of forwarding tables as now claimed in new claims 19 and 20. Surely, this unanticipated and unobvious broadcasting method is of some value.

From a practical perspective, the examiner should realize that networks have distributed caches that can be manufactured by various entities. Claim 1 only covers a broadcasting cache that is the proximal cache, and hence, covers a necessary element to forwarding and routing table migration within an entire network. Claim 1 covers a necessary novel core of the invention because, without this broadcasting of routing information, a distal forwarding and routing table cannot be maintained by a proximal cache. Hence, claim 1 focuses on a core point of novelty while providing clear notice of the scope of the claim. Other systems do have caches, and do have forwarding tables, and do have routing tables, but do not broadcast tri-referenced associated routing information. Hence, the focus of claim 1 is directed to a necessary point of novelty. The threshold point of novelty is the broadcasting of tri-referenced associated routing information. This broadcasting does not include process steps occurring at the destination cache, so that one can determine from claim 1, which caches within a network are covered by claim 1, and which ones are

not. As such, the process steps of claim 1 are executed only at the proximal IPA, give clear notice as to what would infringe, and focus the examination of this case. This claim 1 strategy provides clear notice, covers a necessary point of novelty, and focuses this examination on to that the point of novelty, which is the broadcasting method of claim 1.

As such, the present invention of claim 1 serves to solve the problems of maintaining a network of cooperative caches through the migration of forwarding and routing tables by broadcasting tri-referenced associated routing information. The present invention solves the problem of routing table migration by broadcasting from a first proximal cache to a second destination cache at a destination IPA routing information that associates a URL-Id and a third source IPA. These first, second, and third caches are clearly referenced in claim 1. The associated information includes a tri-referenced destination IPA, originating URL, and a source IPA. This association is recited in claim 1. Claim 1 is particularly recited, novel, unobvious, and useful.

The destination cache need not necessarily store the sought after web content data, but only maintain routing items that define where the web content data may ultimately be located through routing and forwarding, and ultimately stored among the cooperative caches. The web content data specified by the URL can be alternatively cached in and retrieved from a source cache for improved distributive web content data caching. As such, the present invention solves the problem of maintaining cooperative

cache forwarding and routing tables by broadcasting tri-referenced associated routing information. The tri-referenced associated routing information including the URL, source IPA, and the destination IPA, can then be used to create a forwarding and routing table in any arbitrary distal cache, so as to migrate the forwarding and routing table information about the cooperative caches. This migration occurs without regard to load balancing, polling, frequency monitoring, or the mere transmission of URL requests from any one cache to another cache as in Jordan.

Applicant appreciates that many web features are found in various methods operating on various caches in cooperative systems, and that, the examination can become quickly confused if one is not careful to focus on the broadcasting steps of claim 1 in reference to any sole proximal cache, as in Jordan. Applicant was well aware of this potential problem. To make the examination process as focused and as convenient as practicable, claim 1 is directed only to the minimal novel broadcasting steps executed by a single lone proximal cache, so that, operational steps by any other lone cache, such as in Jordan, can be quickly compared for novelty. Does this prior art reference, Jordan, teach or suggest a single cooperative proximal cache executing these tri-referenced associated broadcasting steps? This determination is limited in scope to aid in the examination process. When viewing Jordan, a like reference perspective to a "proximal cache" serves to quickly clarify the comparison and highlight the points of novelties.

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That is, the examiner should compare apples to apples, and any lone cache in Jordan can be compared to the proximal cache of claim 1. However, because all of Jordan's caches operate in like manner, any one cache in Jordan may be used for comparison. In this regard, the migration and creation of forwarding and routing tables can be had through a unilateral tri-referenced associated broadcast communication from a broadcasting proximal cache as in claim 1. A distal cache can then use this broadcast communication for building a forwarding and routing table as recited in claims 19 and 20. For example, when the destination cache receives a URL request, the request can be routed and forward to the source cache and not the originating cache. As such, claim 1 and claim 19 highlight respective bifurcated functions for migrating forwarding and routing tables. Jordan relies on like caches whereas the proximal cache of claim 1 and the distal cache of claim 19 rely on a cooperation between differently operating caches, yet another clear distinction between Jordan and the present invention.

Jordan teaches a load-balancing network of like cooperative caches that store web content data and maintain caching tables. Jordan does not solve the problem of migrating forwarding and routing tables about a network of caches. Jordan does not use the claim 1 solution of transmitting from a proximal cache to a destination cache tri-referenced routing information associating a URL with a source IPA of an alternative source storing or pointing to where the URL's web content data may be subsequently retrieved. In so doing, the invention of claim 1 serves to enable the migration of the forward and routing information about the

cooperative distal caches that can then create forwarding and routing tables arbitrarily anywhere in the cooperative network.

Jordan teaches that when a cache is overloaded by a URL request, the URL request is directed to another destination at a destination IPA, so that the destination, that may store the web content data, can then function as a new alternative source. As such, the destination can retrieve the web content data, store it locally, and then respond to URL requests for the web content data so as to load share. As such, the destination and source are one in the same. Jordan does not solve the problem of migrating forwarding and routing tables among cooperative distal caches. Jordan does not suggests the invented solution of broadcasting to a destination distal cache tri-referenced routing information associating the destination IPA with a URL indicating that web content data can be found in an alternative source cache.

In Jordan, a proximal cache at a proximal IPA receives a request for URL web content data from an originator or client browser. When the proximal cache at the proximal IPA is overloaded, the proximal IPA redirects the original request to a destination IPA also storing the web content data. The request is forwarded to a destination as an alternative source. The request contains an association between the requesting IPA and the URL of the originator originally firstly storing the requested web content data. Then, the destination cache stores the web content data to serve URL requests. The destination retrieves the URL web content data, stores it locally, and updates its caching table indicating

it has stored this URL web content data. Jordan teaches load sharing. Jordan does not teach a method of broadcasting tri-referenced routing information, including an association between URL-Id and an alternative source of the URL-Id web content data and a destination, but rather directs the URL request to an unloaded server storing the sought after URL data. Jordan does not teach a method of broadcasting an association of a source with a URL to an arbitrary destination that can then construct and maintain a routing and forwarding table.

Jordan teaches a load-balancing web content data caching system that maintains a logical central directory for locating where requested web data is stored, preferably in the least loaded cache. (Col 7 lines 60-65). In Jordan, there is a guarantee that the owner indicated in the directory does store the sought after web content data. By contrast, the present invention makes no such guarantee, as the routing information merely provides a direction through which a request could be forwarded or routed until a source cache is eventually reached that does store the sought after web content data specified in the URL request. The broadcasting of claim 1 provides the routing information, including the destination IPA, the URL, and the source IPA, and not the web content data.

The present invention provides for the broadcasting of routing information from a proximal IPA. The routing information at the proximal cache at a proximal IPA location is a tri-referenced association associating the destination cache at a destination IPA, and a source cache at a source IPA, and the URL. The associated URL

request for web content data originally provided at a originating URL IPA is an implied fourth location. The physical locations are the proximal IPA, source IPA, the destination IPA as particularly stated in claim 1, while a fourth location of the original URL IPA location is also inferred. This specifically required tri-referenced association of the destination IPA, source IPA and URL, as recited in claim 1, is essential to understanding the novelty of claim 1 that then enables the migration of forwarding and routing tables. The destination IPA, originating URL, and source IPA association includes routing information associating a source IPA and the URL during broadcasting, which then enables the building of a forwarding and routing table at the destination distal IPA. Jordan does not have this tri-referenced association or the capability of migrating forwarding and routing information through unilateral broadcasting. Jordan does maintain a caching table, which can be used to forward URL requests. However, the caching table is not maintained by virtue of receiving unilateral broadcast tri-referenced associated routing information. The caching table is not maintained by virtue of receiving unilateral broadcast routing information because, in Jordan, at least two of the claimed tri-referenced IPA locations, if not all three, are the same locations. In Jordan, the source and destination are one in the same, which receives a request, retrieves the URL data, updates its caching table, and becomes the alternative source, and hence, the limitation to only caching tables indicating exactly where is stored the requested web content data.

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In view of the abstract of Jordan, a "request" indicating a requester at a requester IPA and indicating the "object", that is the requested URL web content data, is "forward" directly to another cache, so that the "requests" are shifted, that is, forward to another cache also storing the sought after web content data. Jordan does not use routing in any regard, as the examiner incorrectly suggests. Jordan migrates web content data and forwards requests when overloaded. Jordan's shifting by forwarding requests perfects load balancing among caches. As such, Jordan maintains a directory as a correctly named caching table of all caches storing the sought after web content data for forwarding when overloaded. That is, all of Jordan's caches are merely source caches sharing loads by forwarding requests. There is a difference between a caching table and a forwarding and routing table. A caching table points directly to alternative source caches having the stored data. A forwarding and routing table points to another location that may or may not have the stored data, but ultimately indirectly points through a path along which a request is routed and forwarded, hopping from one cache to another, to where the data may be ultimately found. When a proximal cache is overloaded in Jordan, the proximal cache sends the URL request, which is not used as routing information, to an alternate cache location, at an alternate destination. (See Figure 3) As such, each proximal cache monitors the frequency of the requests, and if overloaded, each proximal cache searches its caching table directory to find other caches storing the same web content data, and forwards the request to the alternate source cache. In this manner, load balancing and web content data sharing is achieved.

Jordan forwards a URL request to a destination source cache, being both a destination and a source. Each cache in Jordan is a proximal cache, a destination cache, and ultimately a source cache, each maintaining a respective like caching table. The communicated URL requests or polling inquiries are simply not routing items having a tri-referenced association between a destination IPA, a source IPA, and a URL enabling a migration of forwarding and routing tables. The polling in Jordan is a bilateral communication, and not a unilateral communication. Jordan does not communicate from one proximal cache to a destination cache indicating that data is available through, but not necessarily at, yet another source cache. Jordan's caches do inquire through multicast polling where the information is stored for maintaining the caching table. When stored at the destination, the proximal overloaded cache sends the URL request to the destination to load share. In Jordan, there is no tri-referenced associated routing information broadcast from a proximal cache to a second destination cache indicating a direct forwarding or indirect routing path to where the web data is stored on a third source cache. In Jordan, there is no routing information whatsoever, but rather, mere requests to send web content data to a requester or polling inquiries. In Jordan, an overloaded proximal cache searches its caching table directory, and then communicates and forwards the request from a proximal cache to a distal destination also serving as an alternative source cache. As such, Jordan does imply operation among three locations including a requester, an overloaded cache, and an underloaded cache. The operation in total does involve three locations, a requester, a proximal cache, and a destination source cache. However, the

information consists of mere requests, inquiries, and does not point directly or indirectly to yet another third alternative source cache of the web content data. In Jordan, the destination and source are one in the same. The requests may be also used as the inquiries as to whether or not the web content data is stored at a distal cache. Hence, Jordan's communicated information is different. For maintaining the caching table, Jordan's information may include URL requests, the requester, and the destination, but not URL requests, the destination, and another source. The polling inquires would not include the alternative source as with the tri-referenced associated routing information of claim 1. Jordan provides for mere URL requests or inquiries, whereas the present invention broadcasts actual tri-referenced routing information. The information is different, and hence, Jordan does not anticipate, and information communicated ultimately serves different purposes, such as load sharing using caching tables as opposed to routing information migration, and hence, the arguments as to nonobviousness. Jordan solves the problem of load balancing using forward requests, polling inquires, and caching tables whereas the present invention solves the problem of migrating routing tables and does so by broadcasting tri-referenced associated routing information. With different problems solved, different objectives, and different solutions, Jordan does not remotely suggest the present invention.

Specifically comparing apples to apples, Jordan teaches multicasting where a cooperative cache multicasts URL requests or inquiries to other caches. (Col 8 line 1) These URL requests may

function as simple inquiries, such as, "do you have this information", and the answer may be "yes," indicated by merely sending the web content data in response. In so doing, each cache polls the remaining caches to maintain the caching tables. Jordan maintains a caching table by polling caches through bilateral bi-referenced communications. The present invention broadcasts unilateral tri-referenced routing information, so that, distal caches can maintain routing and forwarding tables. Jordan bilaterally multicasts bi-referenced unassociated inquires to maintain caching tables in proximal caches. The present invention unilaterally broadcasts tri-referenced associated routing information for maintaining forward and routing tables in distal caches. The two processes are completely different serving different objectives for solving different problems.

Jordan is clear and teaches load balancing. "Direct requests 155 are sent from the clients ... to cache server". (Col 5 line 55) "If an actual load imbalance is identified ... the load monitor initiates a shifting of forwarded requests from the overloaded cache to ... less loaded servers". (Col 6 line 3) "if the owner is currently overloaded ... the load monitor finds an underloaded cache ... and assign it as the new owner of the requested object". (Col 6 line 63) "The ownership information for the object in the caching table is updated". (Col 6 line 64). "The request can be forward ... to the new owner". (Col 7 line 3)

The examination states that Jordan's request includes source address, destination address, forwarding address, next hop address,

as disclosed in the request to an arbitrary cache or destination upon a cache miss wherein the new entry is created for the object in the caching table a routing or forwarding table (Col 6 L50-67, and Fig 2a).

Is that really so? A search of specification reveals that the term "HOP" is not found at all. A search of the summary and preferred embodiment reveals that the term "route" is not used at all. Yet, to the examiner, it is apparently clear from these apparent phantom words. Within this cited text, none of these terms are mentioned at all, yet, this section is cited as the basis of the rejection. This is remarkable. Applicant appreciates that the technology is complex and involves many caches at many different locations serving different uses while communicating different types of information. Nonetheless, precise and careful reading is required to fully understand the differences between Jordan and the present invention.

The caching table shown in Fig 2a of Jordan includes objects (the URL) and "Ownership" that is, the caches A, B, C storing the web content data. Such specific A, B, and C caches are not arbitrary, as indicated by the examiner, but indicate exactly where the data can be found and exactly where the request can be forwarded for load balancing and sharing. It appears the examiner reads more in Jordan than what is really there.

The plain full text does not read as the examiner indicates. "FIG. 3 shows an example of a logic flow for steps taken by the

load monitor 120 in response to a request 125 from a cache server 150 because of a cache miss. As depicted, in step 201, it checks to see if the requested object/partition can be found in the caching table. If not, in step, 202, a new entry is created for the object/partition and a cache server is assigned as its owner. After the entry is located in the caching table, in step 203, the forwarding frequency 1011 is updated, e.g., incremented by 1. The load monitor then examines the load table 102 to see if the owner is currently overloaded (and that the forwarding frequency 1011 is a significant contributor thereto), in step 204. If yes, in step 205, the load monitor finds an underloaded (or less loaded) cache server and assign it as the new 10122 (or shared) owner 10122 of the requested object. The ownership information 1012 for the object in the caching table 101 is updated accordingly. Those skilled in the art will appreciate that the logic flow could comprise a shared 10123 or hierarchical ownership 1012 in the caching table 101 or other data structure employed. The request (possibly with a copy of the requested object) can then be forwarded 125 to a new sole 10122 (or shared 10123) owner, in step 206. Alternatively, the new owner can be requested to obtain 115 an object copy from the originating object server, e.g., via the Internet 110." (Col 6 lines 50-66).

As such, the examiner incorrectly cites a specific section of text standing for the proposition that "On the other hand, Jordan, in its clear context, explicitly teaches the process of transmitting routing information, (such as source address, destination address, forwarding address, next hop address, as disclosed in the request) to an arbitrary cache or destination upon

a cache miss, wherein the new entry is created for the object in a caching table, or routing or forwarding table." In discussing Jordan, "in its clear context", the examiner uses the terms such as "source address", "destination address", "forwarding address", "forwarding table", yet a simple cursory examination of the cited text upon which the examiner relies, teaches no such things nor uses any of these terms. Where are these terms in the cited text? How possibly could one make this apparent leap, but through some kind of tortured reasoning? These terms used by the examiner are not in the cited text, nor suggested in any regard, yet asserted by the examiner, as "clear". This is remarkable. The record of the present prosecution is becoming so distorted by the examiner's unsupported assertions, that this record is quickly becoming, in and of itself, a strong indicator of nonobviousness.

Jordan should be viewed from the exclusive perspective of a lone proximal cache, as dictated by the structure of claim 1 of the present invention. Jordan multicasts different information, that may be simple URL requests indicating a requester and the URL to a source of the URL data. This is opposed to broadcasting routing information associating an alternative source and a URL with a destination IPA, which does not even request the URL data. In Jordan, the URL request is communicated to a different location, that is, directly to a source of URL web content data for retrieving the URL content data. This is opposed to communicating to a destination cache that merely receives the routing information indicating an alternative source, which communication can then be used to build a forwarding and routing table. Jordan solves a

different problem that is one of load balancing among like caches. This is opposed to solving the problem of migrating routing information for the purpose of building routing and forwarding tables in different arbitrary distal caches. With all kind due respect, Jordan does not remotely suggest the prevent invention.

Jordan multicasts polling bi-referenced inquiries from a proximal cache to destination caches that affirmatively respond in bilateral communications for maintaining a caching table in the proximal cache, which caching table is then used for forwarding URL requests to those destinations storing the URL data when a URL request frequency at the proximal cache is high for load balancing.

The present invention of claim 1 broadcasts from the proximal cache to destination caches tri-referenced routing information in a unilateral broadcast communication, where the routing information associates a source IPA with stored originating URL data or stored additional routing information to a source of stored URL data along with the destination IPA, so as to enable the maintenance of forwarding and routing tables in the destination caches as in claims 19 and 20.

Jordan relies on like caches all with like caching tables and with like frequency monitoring, whereas the proximal cache of claim 1 and the distal cache of claims 19 or 20 rely on a cooperation between differently operating types of caches. Jordan does not suggest such a bifurcated cache function. The present invention is not required to poll other caches. The present invention does not require load monitoring. The present invention does not require

multicast bilateral communications. The present invention does not maintain limited caching tables restricted to a few caches for simple load sharing only among them through forwarding URL requests. The present invention enables the building of generalized routing and forwarding tables in arbitrary destination distal caches regardless of what web data is stored on the distal destination caches. The present invention enables cooperative caching about a network of cooperative caches without regard to the frequency of URL requests at any one cache. Jordan does not have these benefits. The alternative distal source cache may store and source the URL web content data through directed forwarding requests or the alternative distal source cache may indirectly point through hop routing to yet another more remote distal alternative source cache storing the URL web content data, as indicating the equivalence between forwarding and routing, enabling any number of routing hops to locate the sought after web content data stored in any one of any number of cooperative caches disposed anywhere within a network. The present invention is a significant advancement in the art and enables a comprehensive generalized network-wide distributive caching solution.

The cited references do not teach or remotely suggest broadcasting of tri-referenced associated routing information from a proximal cache to a destination distal cache, with the routing information associating URL web content data at an originating URL with an alternative distal source cache. The tri-reference routing information minimally includes: 1) Source IPA (where the web content data is cached); 2) Origination URL (identifying the

original web content data); 3) Destination IPA (where the source IPA and Originating URL association are communicated for building at the destination IPA routing and forwarding table that directly or indirectly point to the URL web content data at the source IPA). The proximal IPA is a fourth bit of routing information. However, sometimes the proximal cache and the source cache are one in the same. When the destination cache receives this routing information, associating the original URL with the source IPA, a routing can be created in the destination cache associating the source IPA with the originating URL, so that, when a URL request is received by the destination cache, the destination can forward (or reroute) the request using the association between the request's URL to the source IPA, rather than the originator at the originating IPA originally storing the web content data indicated by the originating URL. Hence, the tri-referenced information can be used to build a routing table in a destination cache. When the proximal cache at the proximal IPA broadcast the routing information to many destination caches, the network of cooperative caches can each build a forwarding and routing table for improved web communications. Such broadcasting of this specific tri-referenced associated routing information then enables the maintenance of forwarding and routing tables in arbitrary destination caches for forwarding and routing URL requests about a network of cooperative caches. Allowance of the claims is requested."

END OF APPLICANT'S PRIOR RESPONSE.

Examiner's Rebuttal and Applicant's Response

a) The examiner states that a knowledge of the invention is necessary for the examination and that examination involves a reconstruction analysis from prior art elements. To be sure, the invention must be in mind, and prior art elements can be found, as is most usual, but, it is the cherry-picking of elements based solely upon the claims, and then the unfounded combination of them along the lines of the invention, that is forbidden, as the forbidden reconstruction comes when the examiner, WITHOUT ANY SUGGESTION to do so, rearranges prior art elements and combines them along the lines of the invention to meet the invention. Where is the suggestion in the prior art to associate the specific tri-reference routing information? There is none.

b) The examiner disagrees that Jordan and Garcia do not communicate tri-referenced routing information. This is a remarkable assertion, and clear point of factual difference. The claims just do not cover the communication of the tri-reference routing information randomly at unknown times in bits and pieces, to unknown recipients, for some other purposes, but the association of the information together, called a forwarding and routing item, and then the specific relative communication of the routing item to a relative destination that is relative to the source, proximal cache, or originator. It is the sum total including: the association of the particular tri-reference information, the communications of the tri-reference routing information; and the communication to a relative destination. Surely, caches are networked and routing information has been used, but not this association relatively communicated for the purpose of building remote forwarding and

routing tables. The claim is rejected based upon obviousness and not anticipation, and hence, there must be shown some motivation to combine along the lines of the invention. Jordan and Garcia do not teach any motivation whatsoever to combine the information and communicate the information to a relative destination as referenced by the information. The combination of claim 1 is useful and not suggested in the cited references.

c) The applicant, in dependent claims 19 and 20, set forth the application of claim 1, that is, the motivation for so transmitting the information to remotely build forwarding and routing tables. The examination states that Jordan in view of Garcia discloses the process. This is remarkable. Jordan discloses means for simple caching and Garcia discloses means for building routing tables. It is the Examiner's incorrect conclusions that Jordan in view of Garcia "suggests" the inventions. But, there are no suggestions to cherry-pick, as the examiner as done, the specific information for association and then communicate the same, for the purpose of building a forwarding and routing table in a remote destination, an application of neither Jordan or Garcia. Hence, the combination can not possibly be suggested.

d) The examiner disagrees that other caching systems do not broadcast tri-reference information. Caching systems cache data. The present invention of claim 1 is not concerned about caching data, as that has already been done on the network, but rather, building remote forwarding and routing tables through propagating associated forwarding and routing information to access that cached

data, and therein lies the problem with which the examiner incorrectly draws unsupported conclusions. It is the specific association, as claimed, the forwarding and routing information communication, as claimed, and the relative destination, as claimed, being relative to the originator, source, and the proximal cache, that is novel, as a whole, that then enables the creation of remote forwarding and routing tables. That is, the claim must be read as a whole. Surely, all of this information has been communicated before in bits and pieces, and surely, networked caches are very well known, and surely, routing and forwarding tables have been used, but that is not the point. The focus of the examination should be on the association of particular information and the particular relative communication, and not any association or any information, communicated between any cached elements for various other purposes. It is the particular set of tri-reference associated information and the particular relative positions of the caches that, as a whole, is the core novel part of the invention that is recited in claim 1.

The examiner states "claim 1 simply associates the source IPA and the originating URL and transmits this information." This is a remarkable reduction of the word count of claim 1, and apparently misses the point of the particular tri-reference information and the communications between the proximal cache and the destination, relative to a caching source and a URL originator. Perhaps applicant can be of some assistance. Claim 1 includes communicating the source IPA and originating URL, which communication includes associating the proximal sender as identified by a proximal IPA and

associating the destination identified by a destination IPA. Hence, the association includes the source IPA, URL, proximal IPA, and destination IPA. Because the source cache and the proximal cache can be one in the same, as in claim 3, the tri-referenced information includes at least the source IPA, URL, and destination IPA, forming a forwarding and routing item, all associated together and communicated in association in a packet from the proximal IPA to the destination IPA whereat a table can be reconstructed.

Claim 1 particularly recites:

generating at the proximal IPA
an originating URL (indicating an originator),
generating at the proximal IPA
a sourcing IPA for (indicating a source),
generating at the proximal IPA
a destination IPA for indicating a destination cache,
associating at the proximal IPA
the sourcing IPA and the originating URL as the routing information, and
transmitting the forwarding and routing information from the proximal cache at the proximal IPA to the destination cache at a destination IPA, the transmitting of the forwarding and routing information associates the sourcing IPA the originating URL with the destination IPA.

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In claim 1, there is:

1) an originator, (cache);

2) an originating URL (information and not a request);

3) a source IPA (routing information)
(indicating a source cache);

4) a proximal cache (cache) (which may be the source cache);

5) a proximal IPA (information);

6) a destination (cache);

7) a destination IPA (information);

Here, the forwarding and routing information is associated and relatively communicated. Just because this information, caches, and tables are known, in bits and pieces in the prior art, does not make the particular association and the particular relative communication combination, that is, the claim as a whole, obvious.

e) The examiner indicates that the argument upon which the applicant relies are not found it the claims. Justly so, arguments are not supposed to be appended to the claims. Obviousness is determined by the solution as claimed, and the problem solved, which may not be claimed. The problem solved involves old problems, new applications, new uses, and new motivations, which problems and applications need not be recited in the claims, yet they provide reasons why the claimed combination solution is not obvious. Hence, the problem solved and new application arguments need not be in the claims, as it is enough that the claimed combination, the solution, not be suggested and be useful. The examiner is wrong. Arguments and problems solved need not be recited in the claims.

The specification teaches, and, the inventions of claims 19 and 20 set forth, the application and the purpose, a problem solved, of the association and relative communication. The reasons why an invention is not obvious need not and should not be found in the claims. Rather, the claims recite the cooperative elements performing a useful function. The associated information and relative communication has the useful purpose of being able to migrate tables, the purpose of claims 1 and 21, and the function invention of claim 19. The purpose, not claimed as such, of claim 19 is to perfect a network of cooperative caches with the functional migrated forwarding and routing tables, even though a network of cooperative caches is not claimed in claimed 19, nor must it be so claimed. The examiner found that these combinations are not anticipated, hence, the obviousness arguments. But, arguments are just that. Here, the specific association and relative communication are not suggested in the cited reference, even though, as is common, all of the elements are found in the prior art somewhere, in bits and pieces. The claimed combination has a useful purpose, even though that purpose may not be recited. The purpose and application of the invention of claim 1 need not be claimed. It is sufficient that claim 1 be useful, which it is, because it enables table migration, that it is not anticipated, which has already been found by the examiner, and that it not be obvious, which it surely is not obvious, as there are no suggestions in the cited references to combine forwarding and routing information and relative communication along the lines of the invention.

Where is the suggestion in Jordan and Garcia to associate the specific information with relative communication for the purpose of migrating a forwarding and routing table to a remote cache? There is simply none. What is missing is the motivational purpose of migrating routing tables using the associated information and relative communications, as in claim 1. There is no teaching or suggestion that this information, so associated and communicated, could be used to migrate forwarding tables. The applications and purposes of Jordan and Garcia are different. There are no suggestions anywhere to modify Jordan and Garcia, inconsistent with their teachings, information, communications, and purposes to arrive at the claimed invention, and where, as here, an applicant proceeds contrarily, with a different set of data, differently communicated through different routes to different relative entities, for achieving a different purpose, it is strong evidence of nonobviousness.

Claims 19 and 20 set forth the application of the tri-reference association and relative communication in the context of their purpose, and that is, to create a distally located forwarding and routing table. Claims 19 and 20, in addition to claim 1, require the specific tri-referenced association, the specific relative communications, and, per claims 19 and 20, for the specific purpose of migrating forwarding and routing tables to be built in a cache per that relative communication. Yet, despite this specific association, this specific relative communication, and this specific table building purpose and function, the examiner concludes it is all obvious, without a suggestion to do so. It is

not that Jordan communicates information or that Garcia builds a table, but rather, do they in combination, suggest this specific association, this specific relative communication, and this specific table building purpose and function.

f) The examiner disagreed that Jordan does not teach a method of reconstructing a table. Not any table will do. A caching table indicates the local cache stores the data. A routing table indicates routes from one router to the next. A forwarding table indicates what other cache store the table to which a request can be sent. Caching and routing tables are different from forwarding tables. Just because Jordan communicates some caching information to some destination for indicating a cache source using a caching table, does not mean that Jordan suggests this specific association, this specific relative communication, and this specific forwarding and routing table building purpose and function. Jordan builds a caching table locally from received URL requests and not from forwarding and routing items. Jordan builds a caching table and not a forwarding and routing table. The examiner states that "the request as in Jordan includes the association of a source with a URL to an arbitrary destination because the request includes destination address, source address, URL." Jordan does not send an associated URL as forwarding and routing information, but rather sends a URL request, requesting the URL data. Claim 1 refers to an originating URL, which is information, whereas Claim 19 refers to a URL request, which is an instruction. A URL as associated forwarding and routing information is different from a URL request, which is a functional request for Web data.

In Jordan, a proximal cache at a proximal IPA receives a request for URL web content data from a client browsing requester. When the proximal cache at the proximal IPA is overloaded, the proximal cache redirects the URL request to a destination IPA that will be storing the URL web content data. That is, the URL request is merely forwarded to an alternative source, the destination at the destination IPA. The URL request contains an association between the requesting IPA and the URL request of the URL originator at an originating IPA originally firstly storing the requested URL web content data. Then, the destination cache stores the web content data to serve the URL request. The destination retrieves the URL web content data, stores it locally, and updates its caching table, which is not a forwarding table, but a caching table indicating that the URL data has been locally stored. No forwarding is contemplated by the destination having the stored URL data. Hence, Jordan teaches load sharing and maintains local caching tables using URL requests.

So, in claim 1, when forwarding and routing information is to be propagated about a network of cooperative caches, a proximal cache at a proximal IPA sends a source IPA indicating a source storing URL web content data and sends a URL indicating an originator at the originator IPA, and in so doing, necessarily sends in association the proximal IPA and the destination IPA as a quad-reference association of forwarding and routing information, whereas, in Jordan, when a proximal cache, that is also a source cache, at a proximal source IPA storing the URL web content data is over loaded by a URL request from a browsing requester at a

requesting IPA, the proximal source cache sends the URL request to the destination, which will first download the URL web content data, update its caching table, and communicate the URL web content data to the requester. No forwarding tables are built.

Garcia teaches that each router maintains a plurality of labeled routing trees (LRTs), each LRT corresponding to a type of service of the computer network, wherein the LRTs of routers in the computer network are updated in response to receipt of one or more routing state update messages and wherein LRTs are updated according to whether an optimum routine approach or a least overhead routing approach is used within the computer network, the optimum routing approach routing state update messages are transmitted when at least one of: (i) a routing state update message which causes a link to be added to a subject router's labeled routing trees is received, (ii) a recent routing state update message regarding an existing link in the subject router's labeled routing trees is received, and (iii) a destination becomes unreachable by the subject router.

When a router table has changed upon receipt of a message, the routing tree is updated. The routing state update messages include a link-state information and a node-state information, wherein each router maintains a plurality of labeled routing trees (LRT). Any message transferred between a proximal and destination router has the respective IPAs. A protocol allows for the dissemination of link-state information and node-state information in the form of labeled routing trees (LRTs). Updated routing trees in a routing

state update messages are used to communicate changes in the routing network topology. Garcia, while computing hops, as is expected with routers, does not relate to URLs, and does not relate to finding alternative sources of URL web content data, because Garcia was not concerned with migrating forwarding tables that indicate where Web content data can be found. Forwarding tables are used to route requests to sources of data whereas routing tables are used for determining routing paths for routing requests.

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Claim 1, Jordan, and Garcia Comparison Chart

Claim 1	Jordan	Garcia
Routing Table Migration	Load Balancing	Routing Tree Maintenance
Source IPA Proximal IPA URL data Destination IPA	Source&Proximal IPA URL Request Destination IPA	Proximal IPA Destination IPA
Communicating a routing item	Communicating a URL request	Communicating a routing tree change message
for building routing and forwarding tables	for building caches, caching tables, and serving URL requests	for updating a routing tree table
for distributive migration of forwarding and routing tables	for distributive creation of caches	for network routing topology connectivity maintenance

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Garcia does not relate to a URL or to a forwarding table, and does not provide for the migration of forwarding tables. Garcia does not send a forwarding and routing item, but rather sends in a message, a complete routing tree. Garcia does not send URL identifiers or source IPA routing data, as the web content data is not even addressed. Garcia does not send associated data for updating forwarding and routing tables, but rather sends update routing tables as the message is irrespective of any web content data.

Jordan was concerned with network load balancing using caching tables and communicated URL requests. Garcia was concerned with routing topology updating using updated routing trees and messages that communicated the updated routing trees. How possibly can these two things be combined in any way when they are inherently directed to different teachings and purposes, and not directed to migrating forwarding tables where web content data can be found. One can only guess. However, in so guessing, when a cache has both an internal caching table as in Jordan and an internal routing table as in Garcia, a process could be locally used to translate Jordan's caching table indicating where the web content data is stored and Garcia's routing table indicating paths to various routers, into a forwarding and routing table locally, but that would not be migration by broadcast, but local generation, as is common in the art, and hence, would not reach the claimed invention. In guessing again, Jordan's URL request could be sent to Garcia's router that would then not view the URL request as a request, inconsistent with Jordan's teachings, but rather, view the URL request as URL data

and translate Jordan's proximal IPA as a source IPA, and then update Garcia's routing table into a forwarding and routing table, which would be inconsistent with Garcia's teaching of sending updated routing trees and would also be locally generated and not migrated. Simply put, there is no suggestion to 1) treat Jordan's URL request as a URL identifier inconsistent with Jordan's teachings, 2) use Jordan's proximal IPA as the source IPA inconsistent with the clear language of claim 1, and 3) thirdly, modify Garcia's routing table as a forwarding table using the URL request not as a request but as a routing item for building a forwarding table inconsistent with Garcia's messages, which, even if done under extreme reasoning, would still not reach the claimed invention, as claim 1 recites both a source and a proximal cache. The combination of Jordan and Garcia would still not reach the claimed invention even when reasonably combined according to their teachings.

There is no suggestion in the cited references to construe Jordan's URL request as a URL routing item, to associate Jordan's URL request with another source IPA, to communicate Jordan's URL request as part of a forwarding and routing item communicated between a proximal cache and a destination cache, to use a source and a proximal cache IPA both as Jordan's proximal cache for storing the web content data, to generate a wholly new process that would translate Jordan's URL request into a forwarding and routing item, and to translate Garcia's routing table into a forwarding and routing table.

g) The examiner again asserts that the "receiving unilateral broadcast tri-reference associated routing information are not recited." Again, the examiner contends that the exact language of arguments must be recited in the claims. No, they do not. The claim must have an unobvious useful combination in view of cited references, and no more. Argument as to why the combination is not obvious need not be recited in the claims. Claim 1 does recite the tri-reference association and does recite only one communication that is from the proximal IPA to the destination IPA, and no other, which is, by definition, a unilateral communication. As the destination is arbitrary, but relative, and the communication of claim 1 can be repeated, and hence, practicing the invention of claim 1 more than once, is inherently a broadcast.

Importantly, the examination effectively asserts that because routing information, routing tables, caches, and caching tables are known, the specific association, and the specific relative communication, in combination, would be obvious, irrespective of any application. This is wrong. Yet, when one considers the specific purpose, the application, as in claim 19 and 20, the examiner again finds that the application is suggested as well, but without a suggestion to do so.

h) The examiner states that the application relies upon a unilateral communication. Yes, claim 1 is directed to a unilateral communication, whereas Jordan requires bilateral communications. This difference supports nonobviousness, in that, a unilateral communication can be used for a purpose other than Jordan's

purpose. If Jordan and the present invention have different applications, different purposes, different information, and different relative communications, how possibly can it be suggested to modify Jordan, by its own text, inconsistent with its teaching for another purpose to arrive at the present invention of the associated information and relative communications? It cannot.

i) The examiner refers to the prior art to Jordan using various terms. One problem with this examination has been its inability to examine invention vis-à-vis similarly disposed components. Hence, the need to keep in mind, the specific associations and relative communications.

While it is true that routing information is known, distributed caches on a network are known, and that routing tables are known, there is no suggestion in the cited references to use these specific tri-reference associations and the relative communication, that would then enable the migration of forwarding and routing tables about a network of cooperative caches. The claims being in good condition for appeal, allowance of the claims is requested.

Respectfully Submitted

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